NAUTILUS FNS™
FIBERGLASS D.E. FILTER

INSTALLATION, OPERATION & SERVICE MANUAL

WARNING

THIS MANUAL CONTAINS IMPORTANT SAFETY INFORMATION WHICH MUST BE FURNISHED TO THE END USER. FAILURE TO READ AND FOLLOW INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY AND/OR MAJOR PROPERTY DAMAGE.

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This filter operates under pressure. When closed properly and operated without air in the water system, this filter will operate in a safe manner.

Warning labels should be affixed to the top of the filter and on the clamp bands at all times. Keep safety labels in good condition. Replace missing or damaged safety labels. (For free labels call 1-919-774-4151).

A. HOW YOUR FILTER WORKS

Your vertical grid diatomaceous earth (D.E.) filter is designed to operate for years with proper maintenance. The filter housing is made of corrosion resistant materials and when installed, operated and maintained in accordance with these instructions, your filter will provide years of service.

Your filter must be charged with D.E. at initial start-up. This D.E. will cover the vertical filter grid cloth within the filter with a thin coating. Dirty water flows from the pool through the control valve on the side of the filter and into the lower side connection of the filter (part 32). The dirty water flows through the vertical grid elements (part 17) where dirt is filtered out by the D.E. Coating. All grid elements channel cleaned water into a manifold system (part 16) which exits at the upper side connection (part 28) and through the control valve to return back to the pool. By continuously diluting the dirty pool water with clean water, the entire pool becomes gradually cleaned. Your filter and pump should be sized to circulate from 2 to 4 times the volume of water in the entire pool through the filter every day to accomplish the cleaning.

As dirt is collected in the coating of D.E. in the filter, the pressure will rise and the flow of water to the pool will be reduced. See other sections in the manual to determine when to clean the filter and how to choose the appropriate cleaning method. This filter will only remove suspended matter and does not sanitize the pool. The pool must be sanitized and PH balanced for sparkling clear water. Your filtration system must be configured and sized to meet your local health codes.

*Part no's in parenthesis refer to the replacement parts as shown in the exploded drawing at the end of the manual.

**** WARNING ****

Failure to run your filter or inadequate filtration can result in pool water clarity that could obstruct visability and allow diving into or on top of obscured objects which can cause serious personal injury or drowning.

Clear water is the result of proper filtration as well as proper water chemistry. Pool chemistry is a specialized area and you should consult your local pool service specialist for specific help or instructions. In general proper pool sanitation requires a free chlorine level of 1 to 2 PPM and a PH range of 7.2 to 7.6.

FILTER OPERATIONAL DATA

FILTER MODEL NUMBER	FILTER MODEL (Sq. Ft.)	FLOW RATE (GPM)		TURNOVER CAPACITY (Gallons) (Based on 2.0 GPM/Sq. Ft.)			
		Public 1.5 GPM/Sq. Ft.	Residential 2.0 GPM/Sq. Ft.	6 Hrs.	8 Hrs.	10 Hrs.	12 Hrs.
FNS 24	24	36	48	17,280	23,040	28,800	34,560
FNS 36	36	54	72	25,920	34,560	43,200	51,840
FNS 48	48	72	96	34,560	46,080	57,800	69,120
FNS 60	60	90	120	43,200	57,600	72,000	86,400

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

B. INSTALLATION

****WARNING****

FILTERS SHOULD NEVER BE TESTED OR SUBJECTED TO AIR OR GAS UNDER PRESSURE. ALL GASES ARE COMPRESSIBLE AND UNDER PRESSURE CREATE A DANGER. SEVERE BODILY INJURY OR PROPERTY DAMAGE COULD OCCUR IF THE FILTER IS SUBJECTED TO AIR OR GAS PRESSURE.

1. Check carton for any evidence of damage due to rough handling in shipment. If carton or any filter components are damaged, notify freight carrier immediately.

2. After inspection, carefully remove filter components from carton.

3. Mount filter on a permanent slab, preferably concrete poured in a form or on a platform constructed of concrete block or brick. **DO NOT** use sand to level the filter or for pump mounting, as it will wash away.

4. Provide space and lighting for routine maintenance access. Do not mount electrical controls over filter. In respect for the potential for injury from any pressurized system, it is a good common sense precaution to always stand clear of the filter whenever starting the pump.

5. If you have a Multi-port Valve, assemble the valve to tank, being sure "O" rings on valve fittings are in place and are clean. Use a lubricant applied lightly, such as petroleum jelly, silicone grease, Mytilube or similar product on "O" rings and "O" ring grooves prior to assembly.

6. If you have a two position slide valve, align the valve with tank so that the handle is toward the top of the tank, push valve into ports and turn the valve nuts snugly on tank fittings. It is not necessary to cinch valve nuts to tank fitting beyond hand tightness.

7. Assemble piping and pipe fittings to pump and valve. All piping must conform to local and state plumbing and sanitary codes.

8. Use teflon tape or plastojoint stick on all male connections of pipe and fittings. Use only pipe compounds suited for plastic pipe. Support pipe to prevent strains on filter, pump or valve.

9. Long piping runs and elbows restrict flow. For best efficiency use the fewest possible fittings, large diameter pipe (at least 1-1/2", preferably 2") & locate equipment as close to the pool as possible.

10. A check valve is recommended between the filter and heater to prevent hot water "back up" which will damage the filter and valve. Another check valve is recommended between the filter and the pump to prevent D.E. from migrating back to the pool when the filter is off.

11. The maximum operating pressure of this unit is 50 pounds per square inch. Never operate this filter above this pressure or attach a pump to this filter that has more than 50 psi shut off pressure.

12. Never install a chlorinator upstream of the filter -always downstream and with a check valve in between the chlorinator and filter.

13. A positive shut off valve is not recommended at the outlet of the filtering system. If the system is ever run with such a valve closed, the internal air relief system becomes inoperative and an explosive situation could exist. Additionally, running the system with no flow will seriously damage the equipment.

14. A positive shut off valve is also not recommended at the waste port of the valve. If the system is ever run with such a valve closed, the filter pressure will go abnormally high and increase the risk of vessel separation. Additionally, running the system with no flow will seriously damage the equipment.

15. Never store pool chemicals within 10 ft. of your pool filter and pump. Pool chemicals are corrosive and should always be stored in a cool, dry and well ventilated area.

** WARNING **

Chemical fumes and/or spills can cause severe corrosive attack to the filter and pump structural metallic components. Structurally weakened filter components can cause filter or valve attachments to blow off and could cause severe bodily injury or property damage.

C. INITIAL START-UP

1. On a new pool, clean the pool before filling with water. Excess dirt and large particles can cause damage to pump and filter.

2. Check clamp assembly for tightness. See filter disassembly and assembly procedures.

** WARNING **

Improper tank assembly could cause the tank top to blow off and cause severe bodily injury and/or property damage.

3. Move valve handle to filter position. **Open air bleeder screw** (Item 1) **on the filter top**. Check pump strainer pot to be sure it is full of water. Replace pump lid.

** WARNING **

Air entering filter and/or the filter unit not closed correctly can cause the tank top to blow off and could cause severe bodily injury and/or property damage.

4. Open all suction and return line valves. Stand clear of filter during the following operations.

5. Start pump. The tank will fill with water and expell air from the air bleeder. Close the air bleeder screw only after a steady stream of water comes out.

6. Remove the skimmer lid, put the recommended amount of diatomaceous earth (D.E.) into the skimmer. The D.E. will be drawn into the filter and deposited evenly upon the grid elements. Now the filter is providing the pool with bright, clean water.

NOTICE: Do not operate filter without D.E. charge for more than two minutes. Do not use more than the recommended amount of D.E. in your filter.

D.E. RECOMMENDATION

The amount of D.E. should be between 1 and 1-1/2 pounds for each 10 square feet of filter area or:

MODEL	POUNDS OF D.E.
FNS 24	2.5 - 3.5
FNS 36	3.5 - 5.5
FNS 48	5 - 7
FNS 60	6 - 9

NOTICE: 1/2 pound of DE will fill a 13 oz. coffee can.

7. On a new pool installation, it will require approximately one week to obtain and maintain the water clarity of which your filter is capable. It is recommended to disassemble and clean the filter after initial pool clean up (approximately 48 hours of operation). Follow the instructions given in this manual for disassembly, cleaning and reassembly.

8. Be sure to note the operating pressure of the filter when it is clean and properly charged with D.E. As the filter removes dirt from the pool, the pressure will gradually increase. As a guide, when the pressure has increased 7 to 10 psi from the initial reading, it is time to backwash the filter.

Alternately another method for determining when to backwash the filter is by judging a drop in the amount of water flowing from the filter by observing the flow from the inlet fittings in the wall of the pool. As a general rule, backwashing is needed when the flow rate becomes about 2/3 the rate of a clean filter.

D. FILTER DISASSEMBLY/ASSEMBLY

Before Disassembling Filter:
Backwash filter according to instructions under "Filter Backwash Procedure" but stop after instruction #7. Do not precoat with new D.E.

DISASSEMBLY:

1. Be sure pump is turned off and all pressure has been released from system.

**** WARNING ****

Releasing clamp with pressure on system will cause tank lid to blow off, causing severe injury or major property damage! NEVER adjust, tighten or loosen "V" band clamp when tank is under pressure!

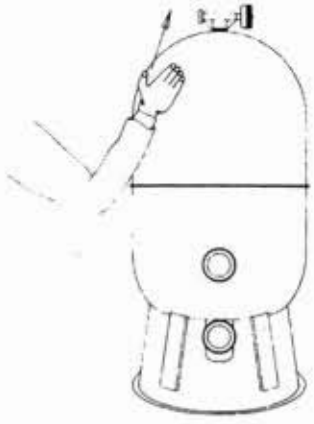
2. Remove filter drain plug and drain all water from tank.

CAUTION: Clamp hardware and filter surface could have sharp edges which can cause bodily injury if improperly handled. Please use caution when performing the following procedures.

3. Loosen clamp nuts alternately until one is removed. Remove spring and washers noting part orientation. Lift clamp assembly off of filter. NOTE - Filters manufactured in 1992 may not contain spring and washers on clamp.

4. Tank halves may have a tendency to stick together. In order to separate tank halves, it may be necessary to strike the tank top using the palm of your hand with a glancing upward movement (Figure A). Proceed gradually around the tank using this motion until the top loosens.

FIGURE A.



5. Being careful not to damage tank seal, lift upper tank shell off of lower tank shell.

ASSEMBLY:

1. Thoroughly clean air relief filter screen on top of manifold EVERY time filter is opened. Be sure to remove all debris from screen.

2. Inspect tank seal (Item 22) for cuts, nicks, etc. If damaged, replace with a new one.

3. Clean tank seal area of tank shell (both halves) and tank seal.

4. Apply a small amount of **silicone** based lubricant to the tank seal.
   Note: PAC•FAB recommends silicone lubricants because they are insoluable in water and therefore provide lubrication for extended periods, are nontoxic and are compatible with nearly all plastics and elastomer materials (except silicone rubber). Excellent lubricants include: • Dow Corning #111, #4, or #7 (Call Dow Corning at 1-800-248-2481 for product availability, pricing or technical information) • Parker **Super-O-Lube** (Do not use Parker O-Lube). This product is widely available at most distributors of rubber products.

5. Carefully install tank seal and upper tank shell.

CAUTION: Be sure upper tank shell contacts tank seal surface evenly and seal area is clean and free from dirt, etc.

6. Install clamp springs, washers and nuts. Tighten nuts evenly and alternately until spring coils touch each other. Tap clamp around tank with rubber hammer to assist seating of clamp. If filter is an earlier model without spring clamp tighten each nut to 120 in-lbf.

7. Use only those components supplied with filter or PAC•FAB replacement parts when dealing with the bands and spring tensioning devices.

**** WARNING ****

Use of non original equipment parts on band clamps with spring tensioning devices may cause these tensioning devices to mal-function, resulting in improper clamp installation. Improper clamp installation could cause the filter top to blow off and cause severe personal injury and/or property damage.

CAUTION: Do not over tighten the clamp band. Tightening the clamp band beyond recommended procedures may damage the clamp band and cause unexpected failure, sudden release of pressure and injury or damage. Over tightening may also deform tank seal, causing leakage at band clamp. Corroded components cannot be repaired and must be replaced. If you are experiencing corrosion, consult your pool service company or dealer.

**** WARNING ****

Always visually inspect filter components during normal servicing to insure structural safety. Replace any item which is corroded, bent or otherwise visually defective. Defective filter components can allow the filter top or attachments to blow off and could cause severe bodily injury or property damage.

E. CLEANING FREQUENCY

The filter on a new pool should be backwashed, disassembled and cleaned after approximately 48 hours of operation to clean out plaster dust and/or construction debris.

Once a new pool has been established, the dirt collected will gradually increase the filter pressure. When the filter pressure increases 7 to 10 psi over the initial pressure or when the flow has been reduced by about 1/3 from when the filter was clean, it is time to backwash the filter. Different areas and water conditions will have different normal cleaning intervals.

If at any time the starting pressure after backwashing the filter indicates 2 to 6 psi higher than normal starting pressure, it is time to perform a manual filter cleaning or a chemical cleaning procedure in the worst cases.

It is a good idea to disassemble the filter and perform a chemical cleaning procedure twice a year to remove accumulated body oils, etc.

In areas that have freezing winter temperatures protect equipment by backwashing and either manually cleaning or chemically cleaning before winter storage. Be sure all water is drained from the filter using the drain plug. The air bleeder must be opened as well as all other valves.

F. FILTER BACKWASH PROCEDURE

CAUTION: To prevent equipment damage and possible injury, turn pump OFF before changing valve position.

NOTICE: When backwashing with a separation tank, see Separation Tank Owner's manual for instructions.

1. Stop pump. Ensure that the backwash line is open and any valving is adjusted to allow the free flow of water.

2. Change valve positions.
   a-If using Multi-port Valve, set to backwash position.
   b-If using Two-Position Slide Valve, raise handle to fully extended position.

3. Stand clear of filter.

4. Start pump, this will circulate water backwards through the filter to flush D.E. cake and contaminants into the separation tank or to waste.

5. If system has a sight glass, backwash until water in glass runs clear.

6. If system does not have a sight glass:
   a-Backwash one minute.
   b-Stop pump and change valve position.
   1) If using Multiport Valve, set to rinse position.
   2) If using Two-Position slide valve, push handle down to filter position.

CAUTION: Stop pump before changing valve settings!

   c-Stand clear of filter.
   d-Restart pump, run for one minute.
   e-Repeat steps a,b,c and d three times.

Cycling is effective when cake and contaminants are difficult to break and flush out of the filter.

NOTICE: Do not vacuum pool while backwashing filter.

7. Stop pump.

8. Open air bleeder screw and release all pressure from tank and system.

9. Follow "Initial Start-Up" procedure to restart system.

10. Compare pressure reading on gauge with reading recorded after initial start-up. The two readings should be very close; if not, do "Manual Filter Cleaning Procedure".

G. MANUAL FILTER CLEANING

NOTICE: At least once a year, disassemble and clean filter regardless of operating pressure readings. This can be done conveniently while winterizing pool in cold climates. Use this method regularly if no means of backwashing is available.

BEFORE DISASSEMBLING FILTER:

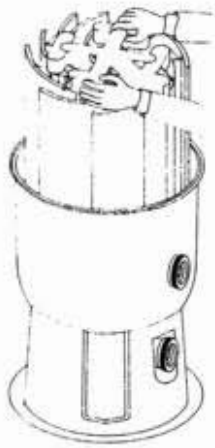
1. Backwash filter as recommended but do not precoat with new D.E.
2. STOP PUMP.
3. OPEN air bleeder screw.
4. WAIT until all pressure is released from filter tank and system before loosening clamp.

**** WARNING ****

Releasing clamp with pressure on system will blow lid off the tank, causing severe injury or major property damage!

5. Disassemble filter (See Page 4)

FIGURE B.



**** WARNING ****

To avoid severe injury or major property damage, exactly follow instructions under "Disassembly" (Page 4)!

6. Grasp element assembly at top manifold using hand holds and lift to remove it (Figure B).
7. Hose down element assembly and clean with bottle brush (Figure C). Use detergent solution or filter cleanser available from a pool service store.

FIGURE C.

NOTICE: To avoid damaging fabric, do not allow filter element to rub on concrete or any abrasive surface during cleaning.

NOTICE: Do not expose element cloth to direct sun for long periods. Direct sun will cause the cloth to deteriorate.

8. Inspect grid cloth for tears, calcification, plugged areas, etc. If necessary, soak element in filter cleanser to remove buildup of oils, etc. It is recommended that an approved cleaner be used. Please contact your local pool chemical supplier or retail store for the proper cleaner.

   Mix a solution following the manufacturer's instructions on the label. Place the entire grid assembly in a plastic container and add the solution so the entire grid assembly is submerged. Allow to stand overnight (12 hours). The following day wash with a hose and remove all of the solution from the grids so it does not return to the pool. If calcified, perform the chemical cleansing procedure described under "Chemical Cleaning Procedures".

9. Thoroughly clean air relief filter screen.
10. With filter drain open, hose down the internal portion of filter and thoroughly clean sealing area of tank halves.
11. Replace the grid-assembly by setting the manifold opening directly over the connector pipe. Push down on the grid assembly and check to see that it is seated properly.
12. Thoroughly clean drain plug seal and sealing area and replace and tighten plug.

**** WARNING ****

To avoid severe injury or major property damage, exactly follow instructions under "Assembly" (Page 5)!

13. If unit is returning to service, see "Initial Startup" (Page 4).
14. If cleaning is part of seasonal shutdown, see "Winterizing" (Page 8).

H. CHEMICAL CLEANING PROCEDURE

1. STOP PUMP.
2. OPEN air bleeder screw.
3. WAIT until all pressure is released from filter tank and system before loosening clamp.

** WARNING **

Releasing clamp with pressure on system will blow lid off of tank, causing severe injury or major property damage.

NOTICE: Do not expose element cloth to direct sunlight for long periods. Direct sunlight will cause the cloth to deteriorate.

NOTICE: To avoid damaging fabric, do not allow filter element to rub on concrete or any abrasive surface during cleaning.

4. Disassemble Filter.

** WARNING **

To avoid severe injury or major property damage, exactly follow instructions under "Disassembly" (Page 4)!

5. Disassemble and inspect element grid assemblies for tears and worn areas. Replace as needed.
6. Rinse each grid thoroughly with water.
7. Wash each grid with a mild soap solution. If necessary, soak element grids in filter cleanser to remove buildup of oils, etc.
8. Rinse thoroughly to remove all soap film.
9. To remove mineral buildup from filter cloth, soak each element grid two to four hours in a solution of one part muriatic acid to ten parts water. Some foaming may occur.

** WARNING **

Follow manufacturer's instructions. Danger of burns or explosion. Do not add water to acid, always add acid to water. Do not allow acid to touch your skin. Do not use acid without eye protection and rubber gloves.

10. Rinse each element grid thoroughly with water.
11. Reassemble element grids.
12. Inspect inside of filter tank and remove all debris remaining after backwashing.
13. Thoroughly clean air relief screen on top of manifold. Be sure to remove all debris from screen.
14. Follow filter assembly procedure (Page 4).

** WARNING **

To avoid severe injury or major property damage, exactly follow instructions under "Assembly" (Page 5)!

15. If unit is returning to service, see "Initial Startup" (Page 4).
16. If cleaning is part of seasonal shutdown, see "Winterizing" procedures below.

I. WINTERIZING PROCEDURE

1. Backwash and manually clean the filter following the recommended procedures.
2. We recommend removing the internal grid assembly and store in a dry area
3. Reassemble the filter following the recommended procedures.
4. Open air bleeder valve. Open all system valves. Position multiport valve between port positions (winterize position) to allow passage to all ports and relieve pressure on the sealing gasket.
5. Remove drain plugs from filter, separation tanks and pumps.
6. Drain system piping.
7. We recommend covering the equipment with a tarpaulin or plastic sheet to inhibit deterioration from the weather.

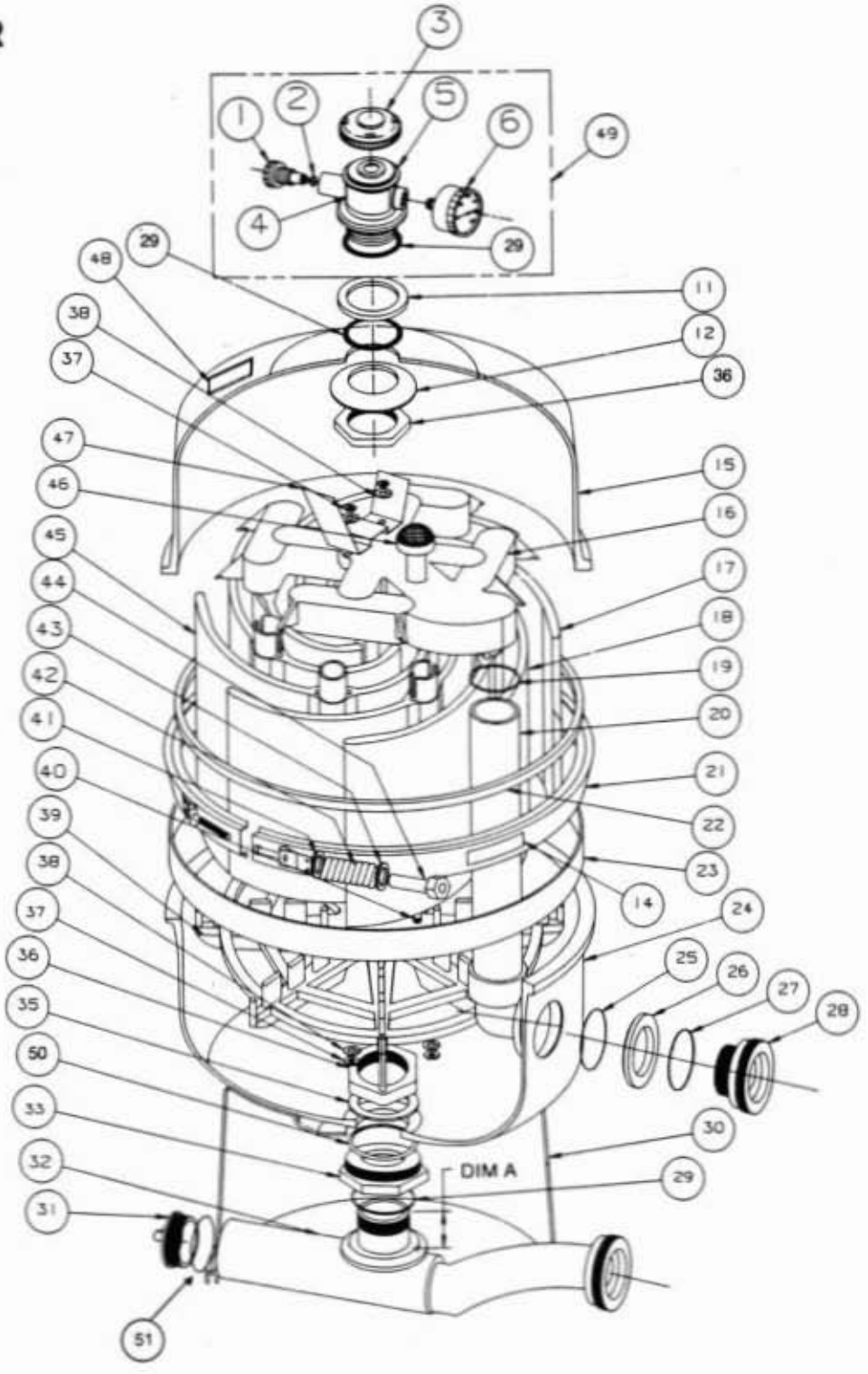
J. REPLACEMENT PARTS

NAUTILUS FNS™

FIBERGLASS D.E. FILTER

DIMENSIONAL TABLE

MODEL	A DIM.	B DIM.	C DIM.
FNS 60	49⅝	53⅛	75
FNS 48	43⅝	47⅛	63
FNS 36	37⅛	41⅛	57
FNS 24	31⅛	35⅛	45



NOTES:

* This Nautilus FNS filter was constructed utilizing one of two types of lower piping assemblies-Item 32. The specific part may be identified by measuring dimension "A" shown on the replacement parts drawing.
DIM "A" FOR P/N 19-5107 IS 2 ½".
DIM "A" FOR P/N 19-5308 IS 1 ¼".

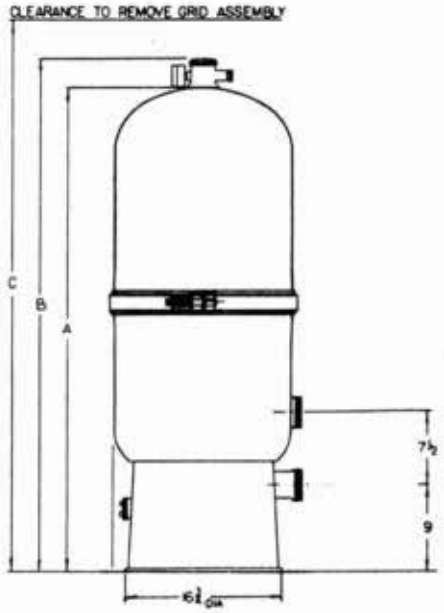
** Nautilus FNS filters manufactured early in 1992 may not contain items 41, 42, 43, 44 as shown on the replacement parts drawing, but will contain two brass hex nuts P/N 19-5152. Do not attempt to interchange components between the two different band types.

PAC·FAB

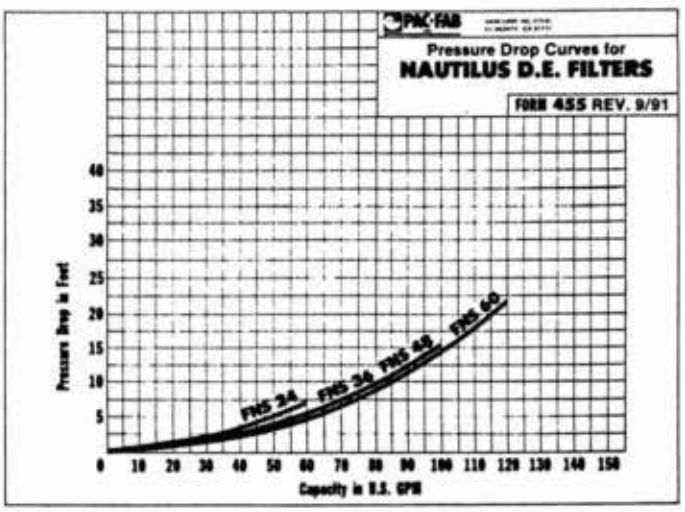
READ AND FOLLOW ALL SAFETY INSTRUCTIONS

ITEM	PART NO.	DESCRIPTION	QTY.
1	27-3506	BLEEDER SCREW	1
2	27-3513	O-RING-BLEEDER SCREW	1
3	27-3501	CAP-AIR RELIEF VALVE	1
4	27-2546	LABEL, WARNING	1
5	27-3555	VALVE BODY-MACHINED	1
6	15-5050	PRESSURE GAUGE	1
7	15-4492	O-RING-2-5/8" ID X 3/16" DIA.	2
11	27-3502	TOP SPACER	1
12	27-3505	FNS SPACER	1
13	19-4908	(OBS)	1
14	19-4996	LABEL, WARNING	2
15	19-5950	TANK-TOP FNS24/36 ST W/EXT AIR RELIEF	1
15	19-5951	TANK-TOP FNS48 ST W/EXT AIR RELIEF	1
15	19-5952	TANK-TOP FNS60 ST W/EXT AIR RELIEF	1
15	19-5941	TANK-TOP FNS24/36 BLK W/2-3/8" HOLE	1
15	19-5942	TANK-TOP FNS48 BLK W/2-3/8" HOLE	1
15	19-5943	TANK-TOP FNS60 BLK W/2-3/8" HOLE	1
15	19-5947	TANK-TOP FNS24/36 BLK W/EXT. AIR RELIEF	1
15	19-5948	TANK-TOP FNS48 BLK W/EXT. AIR RELIEF	1
15	19-5949	TANK-TOP FNS60 BLK W/EXT. AIR RELIEF	1
16	19-2173	MANIFOLD GRID (W/EXTENSION)	1
17	19-2186	GRID-FULL FNS24/INS24	7
17	19-2187	GRID-FULL FNS36/INS36	7
17	19-2188	GRID-FULL FNS48/INS48	7
17	19-2189	GRID-FULL FNS60	7
18	19-2328	GRID-PARTIAL FNS24/INS24	1
18	19-2330	GRID-PARTIAL FN36/INS36	1
18	19-2332	GRID-PARTIAL FNS48/INS48	1
18	19-2334	GRID-PARTIAL FNS60	1
19	19-2323	O-RING-2-3/16" ID X 1/8" DIA	1
20	19-5213	PIPING ASS'Y-UPPER FNS 24	1
20	19-5214	PIPING ASS'Y-UPPER FNS 36	1
20	19-5215	PIPING ASS'Y-UPPER FNS 48	1
20	19-5216	PIPING ASS'Y-UPPER FNS 60	1
21	19-5351	BAND ASS'Y-COMPLETE	1
22	19-5008	SEAL-TRAPEZOID-18" DIA	1
23	19-5337	RETAINER-TANK SEAL	1
24	19-5934	TANK BTM FNS 24 BLK BUTTRESS THREAD	1
24	19-5935	TANK BTM FNS 24 BLK BUTTRESS THREAD	1
24	19-5935	TANK BTM FNS 36/48/60 BLK BUTTRESS THREAD	1
24	19-5930	TANK BTM FNS 24 TAN BUTTRESS THREAD	1
24	19-5931	TANK BTM FNS 36/48/60 TAN BUTTRESS THREAD	1
24	19-5400	TANK BTM, FOOT AND PIPING FNS24 BLK	1
24	19-5401	TANK BTM, FOOT AND PIPING FNS36 BLK	1
24	19-5402	TANK BTM, FOOT AND PIPING FNS48 BLK	1
24	19-5403	TANK BTM, FOOT AND PIPING FNS60 BLK	1
24	19-5141	TANK BTM, FOOT AND PIPING FNS24 TAN	1
24	19-5142	TANK BTM, FOOT AND PIPING FNS36 TAN	1
24	19-5143	TANK BTM, FOOT AND PIPING FNS48 TAN	1
24	19-5144	TANK BTM, FOOT AND PIPING FNS60 TAN	1
25	15-4492	O-RING - 2" BULKHEAD	1
26	19-4893	SPACER-2" EXTERNAL	1
27	19-2320	O-RING-BULKHEAD	1
28	19-4801	BULKHEAD-2"	1
29	27-4494	O-RING-VALVE ADAPTOR	2
30	19-5153	FOOT	1
31	19-5829	PLUG 2" NPSM	1
32	19-5308	PIP. ASS'Y-LOWER (USE W/ADAPTOR 19-5221)	1
33	19-5221	ADAPTOR 6" FNS BUTT THD (USE W/19-5308)	1
34	15-4493	O-RING ADAPTOR 6" FNS (OBS)	1
35	19-5004	WASHER-POLYETHYLENE	1

NOTE 1:
Complete grid assembly consists of: One each of items 16, 39, 47 and 18; Four each of items 37 and 38; two each of item 40; and seven each of item 17.



ITEM	PART NO.	DESCRIPTION	QTY.
36	15-4412	LOCKNUT-2" INTERNAL	2
37	19-2013	NUTS-5/16"-16 SS	4
38	17-4955	WASHER-5/16" SS LOCK	4
39	19-2194	RETAINER GRID	1
40	19-2182	ROD-5/16"X15-1/2" MAN RET FNS24	2
40	19-2183	ROD-5/16"X21-1/2" MAN RET FNS36	2
40	19-2184	ROD-5/16"X27-1/2" MAN RET FNS48	2
40	19-2185	ROD-5/16"X33-1/2" MAN RET FNS60	2
41	19-5610	WASHER FNS/INS SM ID (1.250D, .320ID, .239 THICK)	2
42	19-5612	SPRING FNS/INS	2
43	19-5611	WASHER FNS/INS L6 ID (1.250D, .430ID, .239 THICK)	2
44	19-4997	NUT, MACHINED	2
45	19-5182	GRID ASSY-COMPLETE FNS24 (NOTE 1)	1
45	19-5183	GRID ASSY-COMPLETE FNS36 (NOTE 1)	1
45	19-5086	GRID ASSY-COMPLETE FNS48 (NOTE 1)	1
45	19-5070	GRID ASSY-COMPLETE FNS60 (NOTE 1)	1
46	17-2855	STRAINER-AIR RELIEF	1
47	17-4755	BRACKET SUPPORT (OBS)	1
48	15-2292	LABEL WARNING	1
49	27-3510	AIR RELIEF BODY ASSEMBLY	1
50	15-4494	SQ "O" RING	1
51	19-2323	"O" RING	1



READ AND FOLLOW ALL SAFETY INSTRUCTIONS

K. TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	REMEDY
D.E. Leaking back to pool	1. After backwashing and re-coating the filter with D.E., some amount of "puffback" is normal.	The D.E. will eventually be filtered out of the pool. No action necessary.
	2. Damaged Grid or "O" ring in filter assembly.	Replace damaged grids or "O" rings.
	3. Improper assembly of internal parts.	Correct assembly of parts.
	4. Missing or defective check valve.	Install or repair check valve.
Pool water not sufficiently clean	1. Improper precoat of D.E. on grids.	Use recommended amount of D.E.
	2. Inadequate turnover rate.	Consult dealer or pool service technician.
	3. Pool chemistry not adequate to inhibit algae growth.	Maintain pool chemistry or consult pool service technician.
High filter pressure after backwashing	1. Insufficient backwashing.	Backwash until effluent runs clear.
	2. Filter cloth plugged with D.E. and contaminants.	Manually clean filter grids.
	3. Filter cloth plugged with mineral deposits.	Chemically clean filter grids.
	4. Partially closed valve or restriction in return line.	Open valve or remove obstruction in lines. Open valve in suction line.
Return flow to pool diminished. Low filter pressure.	1. Obstruction in pump hair and lint strainer.	Clean basket in strainer.
	2. Obstruction in pump.	Disassemble and clean pump.
	3. Obstruction in suction line to pump.	Clean skimmer basket. Remove obstruction in lines.
Short Cycles	1. Improper backwash.	Backwash until effluent runs clear.
	2. Pool chemistry not adequate to inhibit algae growth.	Maintain pool chemistry or consult pool service technician.
	3. Improper precoat of D.E. on grids.	Use recommended amount of D.E.
	4. Plugged grids.	Manually clean or chemically clean as required.
	5. Flow rate too high.	Restrict flow to capacity of filter.
Leakage at clamp	1. Improper torque on closure band hardware.	Reassemble clamp following procedure under "Assembly" on page 5.
	2. Debris contamination on "O" ring and flanges.	Clean "O" ring and flanges. Lubricate "O" ring.
	3. Cut or damaged "O" ring.	Replace "o" ring.

NOTES

READ AND FOLLOW ALL SAFETY INSTRUCTIONS